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but $p^2 = \frac{b^4}{a^2}$, and $1 - e^2 = \frac{b^2}{a^2}$, or, $(1-e^2)^{\frac{3}{2}} = \frac{b^3}{a^3}$; $\therefore \frac{p^2}{(1-e^2)^{\frac{3}{2}}} = \frac{b^4}{a^2} \div \frac{b^3}{a^3}$ $= a\,b$, and the above equation becomes

$$a\,b\,\theta = a\,b\,\pi - \frac{b^2\,e \sin x}{1 + e \cos x} - a\,b \tan^{-1}\left(\sqrt{\frac{1+e}{1-e}}\,.\cot\tfrac{1}{2}\,x\right),$$

$$\text{or, } a\,\theta = a\,\pi - \frac{b\,e \sin x}{1 + e \cos x} - a \tan^{-1}\left(\sqrt{\frac{1+e}{1-e}}\,.\cot\tfrac{1}{2}\,x\right),$$

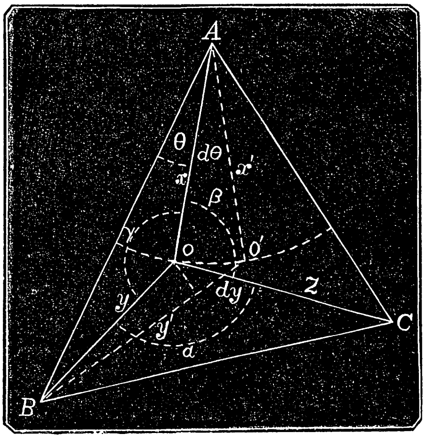
$$\text{or, } \theta = \pi - \frac{b\,e \sin x}{a(1 + e \cos x)} - \tan^{-1}\left(\sqrt{\frac{1+e}{1-e}}\,.\cot\tfrac{1}{2}\,x\right. \ldots\ldots \quad (3);$$

and this is the relation existing between the mean anomaly and the true anomaly.

SOLUTION OF A QUESTION INVOLVING A MINIMUM.

The following problem is found in the *Mathematical Monthly*, (Runkle's): "Find a point, O, within a triangle, such that $O\,A^n + O\,B^n + O\,C^n =$ a minimum."

[The solution there given is a good one; but a friend of mine, in the United States Coast Survey, dreamed out the solution below, and conveyed it to paper in the morning. I give it for publication; but he disallows the use of his name.]



[*Notation seen from the figure.*]

$$x^n + y^n + z^n = \text{a minimum.}$$

Let x at first be constant, y and z vary.

$$\therefore\ y^{n-1} d\,y + z^{n-1} d\,z = o. \qquad (1)$$

Now $d\,y = x\,d\,\theta \sin\gamma$, from infinitesimal triangle

similarly $d\,z = -x\,d\,\theta \sin\beta$.

Substituting in (1)

$$x\,d\,\theta\,(y^{n-1}\sin\gamma - z^{n-1}\sin\beta) = o.$$

$$\therefore \frac{y^{n-1}}{\sin\beta} = \frac{z^{n-1}}{\sin\gamma}.$$

If x also vary we have $\frac{x^{n-1}}{\sin\alpha} = \frac{y^{n-1}}{\sin\beta} = \frac{z^{n-1}}{\sin\gamma}$

If $n = 1$, $\alpha = \beta = \gamma$, each $= 120^0$.

If $n = 2$, $\frac{x}{\sin\alpha} = \frac{y}{\sin\beta} = \frac{z}{\sin\gamma}$,

that is, the point is the center of gravity of the triangle.

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